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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,717	02/06/2002	Takao Mukai	36856.603	4047

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EXAMINER

SUMMONS, BARBARA

ART UNIT	PAPER NUMBER
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2817

DATE MAILED: 04/06/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application N .

10/066,717

Applicant(s)

MUKAI ET AL.

Examiner

Barbara Summons

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pwl

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 8-14 and 22-28 is/are allowed.
- 6) ☒ Claim(s) 1-7, 15, 16 and 18-21 is/are rejected.
- 7) ☒ Claim(s) 17 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/6/02 & 2/24/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the interdigital transducer (IDT) having "split electrodes" (claim 16) and "withdrawal performed" (see claim 15) so that the outermost electrode and the one adjacent thereto are "connected to the same potential" as recited in claim 16, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. [See also the § 112 rejection below].

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. Claim 16 is rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 16 cannot be understood in light of the specification because such an embodiment has not been shown in the figures, and, because a split electrode IDT already has two adjacent electrodes at the same potential, it is unclear if the "withdrawal" is intended to result in three adjacent electrode fingers (i.e. 1 and 1/2 split electrodes) at the same potential or four adjacent electrode fingers (i.e. 2 split electrodes) at the same potential. Clarification is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 5-7, 15 and 19-21 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kadota et al. U.S. 6,150,900 ('900).

Fig. 7 of Kadota et al. '900 discloses an edge-reflection surface acoustic wave (SAW) filter using Shear Horizontal (SH) type SAWs (see e.g. claim 1, the last 4 lines), comprising: a piezoelectric substrate 1x having opposing first and second reflection edges (unlabeled and the left and right substrate edges in the figure; see also col. 4, lines 50-55); at least two interdigital transducers (IDTs) 23a-23c, including electrode fingers, are disposed on the piezoelectric substrate 1x; and wherein at least one of the electrode fingers located at an outermost position in the direction of propagation of the SAWs on the side of at least one of the reflection edges "is removed". For example, on both the outermost left and right hand edge positions of IDT 23a one of the split finger electrodes is removed so that the electrode adjacent the reflection edges is a single electrode (see col. 7, lines 26-29). It should be noted that reciting an electrode finger "is removed" is a non-positive structural limitation because it recites a structure that is not there, and so can be interpreted in a myriad of ways. An alternate interpretation would be that in Fig. 7, the outermost electrode finger of IDT 23b at the left side edge "is removed" and replaced by connection electrode 6. Also, "is removed" has the sound of

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a method step limitation, which does not have a bearing on the final structure of the apparatus.

Regarding claim 2, the IDTs 23a-23c include split electrodes and all of the resonators can have split electrodes (see Fig. 9). Regarding claims 5-7, the filter is a SAW ladder filter (see also Fig. 2) in a duplexer 1 (Fig. 16) of a communications apparatus (Fig. 17).

Regarding claims 15 and 19-21, Fig. 15 of Kadota et al. '900 discloses a SAW ladder filter wherein IDTs 62a, 62b and 63b have each had an outermost electrode 69 withdrawn and placed at a same potential as the electrode adjacent thereto. That is, the electrode 69 and the electrode adjacent thereto, form the same structure at the reflection edges as Applicants' Fig. 4. Figs. 16 and 17 show the duplexer etc.

5. Claims 15 and 18 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kadota et al. U.S. 5,767,603 ('603)[cited by Applicants].

Fig. 10 of Kadota et al. '603 discloses an edge-reflection SAW filter using SH waves (see e.g. col. 2, lines 23-25), comprising: a piezoelectric substrate 52 having opposing first and second reflection edges 51a and 51b; at least two IDTs 53 and 54 including electrode fingers, and which form a transversely coupled resonator filter (see col. 7, lines 3-5), are disposed on the piezoelectric substrate 52; and wherein withdrawal is performed (see e.g. col. 4, lines 9-11 and col. 5, lines 11-16 with Figs. 4, 5, and 8, and col. 7, lines 1-4) so that at least one of the electrode fingers located at an outermost position in the direction of propagation of the SAWs on the side of at least one of the reflection edges (i.e. the outermost electrode finger of IDT 54 at edge 51b at

the lower right corner of Fig. 10) is connected to the same potential (i.e. bus bar 57) as an adjacent one of the electrode fingers.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7. Claims 1-4, 6 and 7 are rejected under 35 U.S.C. § 103(a) as being obvious over Kadota JP 2000-068782 (JP 2000) taken in conjunction with Ono et al. JP 60-041809 (both cited by Applicants).

Ono et al. discloses an edge-reflection SAW filter using SH waves (see the abstract, line 8) wherein the outermost fingers are "removed" from Fig. 1 and Fig. 2 so that a space between the reflection edges and the outermost remaining electrode finger is a multiple of 1/2 wavelength of the propagated SAW (see the abstract, lines 3-5 and 10-13) and so that the outermost electrode is less likely to be damaged by dicing (see

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the abstract, lines 13-14). When the multiple of $1/2$ wavelength is one, the distance A in Ono et al. Fig. 6 is $1/2$ wavelength, and the device is the same as Applicants' Fig. 1 (see Applicants' specification at page 14, lines 12-14) and the "removing" of the edge electrodes of Figs. 1 and 2 of Ono et al. is done for the same reason as Applicants' "removing" is done (see Applicants' specification at page 14, lines 1-6).

Whereas, Ono et al. has shown the "removing" of electrode fingers in single electrode finger IDTs (Fig. 1) and split electrode finger IDTs (Fig. 2), Ono et al. has not shown "at least two" IDTs, a longitudinally coupled or transversely coupled filter, or a duplexer of a communications apparatus.

Kadota et al. JP 2000 discloses that it is known to use multiple edge-reflection SAW IDTs in a longitudinally coupled filter (Fig. 2), a transversely coupled filter (Fig. 3), and a duplexer 34 (Fig. 4) of a communication apparatus 31.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the SAW single resonator filter of Ono et al. (Figs. 1 or 2 with Fig. 6), by having used it in a longitudinally coupled filter or a transversely coupled filter or a duplexer of a communication apparatus, because such obvious modifications would have been merely well known alternate intended uses of such edge-reflection IDTs as suggested by the exemplary teachings of Kadota et al. JP 2000 (Figs. 1-4). Alternatively, it would have been equally obvious to one of ordinary skill in the art at the time the invention was made to have modified any of the devices of Kadota et al. JP 2000 by "removing" an electrode finger so that the space between an edge of the substrate and the remaining outermost electrode finger would have been

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1/2 wavelength of the SAW, such as taught by Ono et al. (see the abstract and Figs. 1 and 2 with Fig. 6), because such an obvious modification would have had the advantageous benefit of reducing the chances of damaging an outermost electrode in the dicing procedure, as explicitly suggested by Ono et al. (abstract, lines 13-14).

Allowable Subject Matter

8. Claims 8-14 and 22-28 are allowable over the prior art of record.
9. Claim 17 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
10. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record does not disclose or fairly suggest an edge-reflection SAW filter using SH waves having each of the specifically recited combinations of features, and especially having an outermost electrode finger at the reflection edges being "a floating electrode finger" (claim 8, lines 10-13); or a distance between the outermost electrode finger and its adjacent electrode finger being "shorter than a distance between other electrode fingers" (claim 22, lines 14-17).

Conclusion

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

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Kadota et al. U.S. 6,531,937 discloses various distances between an outermost electrode finger and a substrate edge in an edge-reflection SAW filter (see the abstract and Fig. 3).

Kadota U.S. 6,346,864 discloses various edge-reflection SAW filters.

Kadota et al. U.S. 6,297,713 discloses edge-reflection SAW ladder filters with various widths of the outermost electrode finger (Figs. 1 and 4 and 7).

Kadota et al. U.S. 6,297,712 discloses edge-reflection SAW filters with longitudinally coupled filters and transversely coupled filters (Figs. 1, 4 and 5).

Kadota et al. U.S. 5,977,686 discloses varying the distance D' between an electrode and a substrate edge and D between other electrode fingers (Fig. 1).

Morozumi et al. U.S. 5,986,523 discloses edge-reflection SAW filters that are longitudinally coupled and use more than two IDTs (see Fig. 3 vs. Fig. 9).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Summons whose telephone number is (571) 272-1771. The examiner can normally be reached on M-Th, M-Fr.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bob Pascal can be reached on (571) 271-1769. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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March 30, 2004



**BARBARA SUMMONS
PRIMARY EXAMINER**